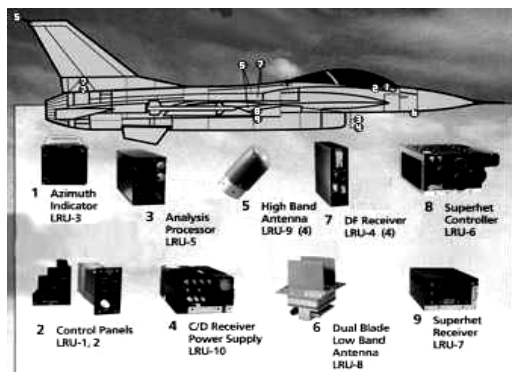


RADAR WARNING RECEIVER (RWR) AN/ALR-56M



The ALR-56M Radar Warning Receiver (RWR) contributes to individual aircraft survival through improved aircrew situational awareness of the radar guided threat environment. It includes a fast scanning superhet receiver, superhet controller, analysis processor, low band receiver/power supply, and four quadrant receivers. It provides inputs to the ALE-47 CMDS (Countermeasure Dispenser System) to enable the selection and dispensing of chaff and flares for aircraft self-protection and provides ALE-47 status indications. The ALR-56M is designed to provide enhanced performance in a dense signal environment and improve detection of modern threat signals compared to the version of the ALR-69 that it replaces. A miniaturized version of the F-15's ALR-56C, the ALR-56M, is a form and fit replacement for the ALR-69 RWR in the F-16 Block 40 and other aircraft. The ALR-56M is the RWR chosen for integration into the open architecture Defensive System Upgrade Program in the B-1B bomber Conventional Mission Upgrade Program. The ALR-56M upgrades are developed in conjunction with upgrades to the ALE-47.

BACKGROUND INFORMATION

The National Defense Authorization Act for the Fiscal Year 1989 directed that "all future operational results for RWR update programs be reviewed and approved by the Director of Operational Test And Evaluation, prior to obligation of production funds." ALR-56M is such a program.

A December 1992 DOT&E Beyond Low Rate Initial Production (BLRIP) report stated that ALR-56M was effective and suitable. In addition, the 1992 DOT&E BLRIP report recommended Follow On Test and Evaluation (FOT&E) "because of the deferral of tactics verification testing and the concern about bearing errors and delayed deletions during extensive maneuvers." The current TEMP calls for additional ALR-56M testing as part of continuing Block 40 and Block 50 F-16 follow-on testing.

FOT&E has been conducted by the U.S. Air Force Air Combat Command (ACC), Air Warfare Center on subsequent software versions. ACC has continued routine upgrades to Mission Data Table software to keep pace with the changing electronic order of battle priorities for various geographical areas of operation. However, tactics verification testing during FOT&E resulted in notations in the ALR-56M User's Handbook concerning the operational significance of the performance problems considered to be training issues. Training is required to ensure that aircrews understand ALR-56M performance during maneuvering.

Some of the major operationally significant changes associated with the latest software upgrade, Operational Flight Program (OFP) 0040, include the following:

- Reduced ambiguities between the Surface to Air Defense System (SADS) X TTR (target tracking radar) and AI (airborne interceptor) radars.
- Reduced number of multiple threat symbols associated with burst-ranging radars.
- Repeats of the missile launch audio warning instead of a one-time initial warning.
- Threat symbol age out as soon as a break-lock occurs during excess maneuvers, and re-display as soon as a new lock-on occurs.
- Improvements to the ALE-47 and the interface with it.
- System initialization, reset and internal communications deficiencies.

Requirements for changes to the fielded Operational Flight Program (OFP) include deficiencies noted in previous testing, desired enhancements targeted at handling evolving threats, and man-machine interface improvements directed at improving pilot situational awareness. Desired changes to the fielded OFP are a culmination of user requirements consolidated and prioritized by Headquarters, ACC, Air Force. A broad summary of those software changes include: (1) update of Mission Data threat parameters; (2) improved threat information interface with the ALE-47 expendable countermeasure dispensing system (OFP); and (3) improved detection of emitters with complex waveforms.

TEST & EVALUATION ACTIVITY

Developmental Laboratory and Flight Testing of ALR-56M 0040 OFP, the latest software version upgrade, was conducted by the 416th Flight Test Squadron at Edwards AFB, CA, during 2QFY98-2QFY99 and encompassed a variety of Air-to-Air and Air-to-Ground flight profiles. The system transitioned to the 36th Electronic Warfare Squadron at Eglin AFB, FL, where it entered Phase I Operational Testing (Familiarization & Training) during 4QFY99. Several significant deficiencies were discovered in both DT and OT, and the program was halted for corrections 2QFY00. New, corrected software for DT was delivered in 4QFY00, followed by a combined DT/OT at Eglin during 3-4QFY01. The system was certified for entry into dedicated FOT&E at the end of 4QFY01, and DOT&E approved the FOT&E test plan at the same time. Ongoing OFP changes delayed finishing FOT&E in CY01, but tests are currently in progress.

TEST & EVALUATION ASSESSMENT

Technical challenges, to fielding the new software update, center on resolution of problems with the new mission data generator, which require an extensive update for the new software version. Challenges do not appear insurmountable, but will require continued use of early system integration and robust testing to resolve and produce an effective and suitable upgrade. Interoperability testing with the EA-6B Prowler has yet to be accomplished. The FOT&E (Air Force uses the term, Force Development Evaluation) test delays should finish in FY02, with subsequent data analysis to follow.